Before the

Federal Communications Commission

Washington, D.C. 20554

In the Matter of:	)	**May 18, 2004**
Improving Public Safety Communications in the 800 MHz Band	)	
Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels	)	***WT Docket No. 02-55***

May 18, 2004

Arizona Public Service Company (APS) hereby submits its response to the 800 MHz re-banding proposal (FCC proceeding 02-55) in regards to the Mexican border area issues. Assuming that a re-banding plan goes forward, APS believes that its recommendation, discussed below, would supply an **improvement** to the plan as a solution to the Mexican border area problem.

APS and its parent, Pinnacle West Capital; Corporation, have submitted several sets of comments in this rulemaking and also as participant in the "Border coalition". Assuming the FCC is planning to adopt some sort of re-banding for the 800 MHZ band, APS is submitting these recommendations to help define specifics how it could be implemented in the border area between Arizona and Mexico.

APS's interest in this proceeding is grounded upon its concern that its statewide 800 MHZ trunking system be protected and its continuing concern for unimpeded coordination and communications efficiency with the various units and groups that comprise public safety and critical infrastructure in Arizona.

Background

There are three large Mexican border area communities in Arizona:

1. Tucson about 65 miles north of the Mexican border is on the edge of the 70 mile border zone. Tucson's 800 Mhz spectrum is 100% utilized and has several co-channel conflicts due to offset frequencies not being coordinated correctly.

2. Yuma in the southwest corner of the State is very near the Mexican border; and

3. Nogales, located at the border with Mexico .

The U.S. Spectrum at Yuma and Nogales is 100% utilized. Arizona also has significant border area channel issues along the Colorado River north from Yuma up to Parker due to offset frequency license conflicts.

Mexican border area overview

For those not familiar with the Mexican border zone issues, here is a brief summary.

- The border zone extends 70 miles from the border with Mexico.
- It has a different band plan than the rest of the United States. One half of the spectrum is allocated to Mexico which can be used on US soil on a secondary non- interference basis with any Mexican use; however, no band plan is defined for this secondary use nor is there a coordination procedure with Mexico that exists today.
- All of the 25KHz wide channel frequencies are offset 12.5kHz from the rest of the US and their bandwidth is still 25 KHz wide.
- The channel allocation plan in the Mexican border area is different than in the regular area. Many public safety channels are allocated between 861 and 866, so that, near the 70-mile boundary, a public safety channel can be co-channeled with a low site SMR channel. This has led to frequent mis-coordination issues and license conflicts.
- Channels in the range of 806-811/851-856 MHz are allocated to Mexico. This presents a significant concern in regard to the Consensus Plan because it is that Plan's target area for relocating the NPSPAC channels.
- Channels in the range of 811-816/856-861 MHz are allocated to the United States. The band plan has interleaved uses but uses a different allocation than the rest of the United States. The Consensus Plan states that in the border area, the NPSPAC channels should be moved to this spectrum; however the mixing of 12.5 KHz channels and 25 KHz channels has not been done in this portion of the 800 MHZ band and there are concerns that is can be accomplished without degrading the NPSPAC channels.
- Channels in the range of 816-821/861-866 MHZ contain alternating US and Mexican channels. Unlike the regular area, this spectrum was not converted to auctioned SMR EA spectrum. A high percentage of it users are public safety; ILT, business, and high site SMR licensed users.
- Channels in the range of 821-824/866-869 MHz are NPSPAC channels with one half of the channels allocated to Mexico in channel blocks of nominally 9 channels, with guard band channels. Thus there are only 112 US NPSPAC channels instead of the 232 normally allocated with NPSPAC. Five of these channels are allocated to national and international joint use. The existing capability of public safety to roam between the regular area and the Mexican border zone area using the NPSPAC channels may be lost no matter what solution is implemented (except Alternative 1). Also the allocation of consistent

joint use NPSPAC channels (USA interoperability channels) may be lost for all implementations (except Alternative 1).

- Nextel does not dominate the Mexican border area 800 Mhz spectrum as it does in most other areas. In order for the Consensus Plan to maintain equity of spectrum, the Consensus Plan assumes that Nextel or other low site SMR owns or controls at least 156 existing channels in each border area community. These 156 channels provide for an equivalent amount of spectrum for the channels Nextel would be allocated. (100 for the U.S. channels between 861-866 MHz, and 56 for 25 KHz equivalents for the 112 NPSPAC channels). In about half of the communities along the Mexican border, Nextel does not yet control enough spectrum to satisfy the Consensus Plan[1]. Assuming a technical method can be achieved to move the NPSPAC channels, in some areas the Plan may actually force several non SMR entities to use channels above 821/861 MHz. In these areas it not likely that any additional spectrum can be provided for additional 800 MHZ band public safety channels in the border area. In the Yuma area, the Consensus Plan is short by approximately 100 Nextel or low site SMR channels. See Footnote 1 for the numbers in other border cities.[2]

Statement of problem APS is attempting to solve

Two things are needed for the Consensus Plan to work in the Mexican border area:

- Nextel or low site SMR users should already own or control at least 156 US channels in all of the border area communities.
- Radio equipment manufacturers and vendors must support the interleaving of narrow and wide band channels to deal with the NPSPAC channel move.

APS is asking that a plan be provided from Motorola and other radio system manufacturers for the equipment change identified below to solve the relocation of the NPSPAC channels in the Mexican border area.

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[1] See preceding 02-55 submittal from Nextel on Aug 07/ 2002 in the appendix. Nextel lists the number of channels it controls in the top 320 markets, for the cities identified as Mexican, all but two of the markets fall below 156, the number of channels needed to satisfy the Nextel plan of swapping NPSPAC channels for Nextel channels below 861 Mhz in the Mexican border area*: San Diego CA – 114 channels, Tucson AZ 134 *channels, El Paso TX 176 channels, McAllen TX 67 channels, Brownsville TX 72 channels, Las Cruces NM 158 channels, Laredo TX 139 channels, Yuma AZ -62 channels.
*(*These numbers have changed since Aug/2002, in Tucson Nextel now controls approximately 161 channels)*

[2] For an extended discussion about the Mexican border area re-banding issue, see:

Proceeding 02-55 submittals by City of San Diego and County of San Diego in proceeding 02-55 on 12-24-2003 & 2-18-2004

Proceeding 02-55 submitted by Pinnacle West Capital Corporation/Arizona Public Service Company on 2/10/03 and various other dates:

See Proceedings submitted by the "Border coalition"

So far, in regards to NPSPAC, no existing APCO 16 trunking (nor any manufacturers) equipment today supports a Consensus Plan-like re-banding in the Mexican Border area. The Consensus Plan calls for moving the 112 US NPSPAC channels down to US Channels in the range from 811-816/856 – 861Mhz [3]. The basic problem is that the 12.5 KHz NPSPAC channels operating in the Mexican border areas would have to be relocated into channels that are 25 KHz channels in the regular part of the US. Also special consideration will need to be made so that co-channel users north of the border zone are compatible with the users of the channels in the Border zone (i.e. public safety should be co-channeled with public safety).

To make any NPSPAC re-banding plan work in the border area at least one of the following alternatives must be implemented:

ALTERNATIVE 1 - Talk to Mexico
The best technical alternative would be to renegotiate the treaty with Mexico, to simply swap the existing NPSPAC region with the new NPSPAC region used in the rest of the US. It has been stated that this is not likely to happen, although there has been no known effort to try. Perhaps western Border States statesmen can work directly with the affected Mexican states and provide a timely solution while the treaty is being worked from Washington, D.C. by Congress. Given the nature of the technical options available, serious consideration should be given to leaving the NPSPAC channels where they are until the treaty is renegotiated. Even though it may introduce problems near the 70 mile edge in the regular area, it may be the best solution that would have the least negative impact on existing public safety users in the Mexican border area. At a minimum, an agreement to allow use of the five channels that are allocated to national and international joint use should be obtained.

Alternative 2 - Mix narrow and wide channels as proposed in Plan
This plan would change the band plan to allow intermixed NPSPAC 12.5 KHz narrow channels with 25 KHz wide channels. The band plan would vary from one region of the country to another. Radio manufacturers and vendors must change the radio systems to support intermixed narrow channels with wide channels and still support interoperability with areas north of the Mexican border zone.

The problem is that the 12.5 KHz NPSPAC channels in the Mexican border area would be relocated into spectrum that has wide band channels in the regular part of the US. Thus a radio that communicates in both areas would have to know if it should use narrowband (12.5 KHz) or wideband (25 KHz) allocations.

For this alternative radios and infrastructure are needed that would support the following:
1) Assume channel center frequencies could occur on 6.25 KHz intervals.

[3] See slide presentation of March / 2003 for IWCE, by Alan Tilles and post reply comments in the proceeding.

2) Assume that 2 NPSPAC 12.5 KHz channels will reside in the location of one 25 KHz wide channel with no overlap.
3) Allow a mobile or portable radio to use both wide and narrow channels for voice channels without manual intervention.
4) Control channels could be narrow or wide channels.
5) When identifying the voice traffic channels the voice channel width information would also have to be obtained.
6) For systems that span both border areas and regular areas the band plan could change from site to site within the trunking system. For example; with some sites NPSPAC channel 601 may start at 851.0125, other sites may have channel 601 start at 856.500, and still at other sites channel 601 may start at 866.0125.

Questions to answer in regards to the band plan radio re-design.
Q) Would mobile and hand held units need to be replaced or can some models be upgraded through software changes?
Q) Could a design be achieved in which the over-the-air protocol would not have to change?
Q) Would these mobiles be compatible with already deployed systems?
Q) Some wide area systems support base stations in both the Mexican border area and the normal US area, what will be the effect on these systems?
Q) Will the infrastructure be compatible with existing mobiles that might roam into the area?
Q) How much of the infrastructure would have to be replaced and/or upgraded?
Q) Can the changes be made to be compatible with APCO 16 standards, or would a forklift upgrade to APCO 25 standard digital platforms be required?
Q) Schedule - when would it be ready for implementation?
Q) Development cost? Subscriber Cost? Infrastructure cost?

ALTERNATIVE 3 – reallocate 112 Narrow to 56 Wide Channels
Reallocate the 112 NPSPAC narrow channels to 56, 25 KHz wide channels.
For this alternative public safety would give up 56 channels but retains an equal amount of spectrum. Rebuild the Mexican border area public safety systems to use multiple shared systems, to compensate for a reduction in actual channels. Potentially in some communities simulcast systems may need to be installed to provide enough channels and future growth capability. Although radical, this is the one solution that appears to be technically feasible at this time. In Arizona, this may involve simulcast systems in Tucson, Nogales, and Yuma to allow the 112 NPSPAC channels to be replaced by 56, 25 KHz wide channels. This may be an interim solution until equipment is available that would support alternative 2, the mixing of wide and narrow channels.

For Arizona, this would mean essentially building a new regional communication system for public safety in southern Arizona. Tucson, Arizona has 96 NPSPAC channels licensed. To utilize the decreased number of channels in an efficient manner, a new trunking system may have to be built and shared by several entities.

The cost of such a system with less available channels using simulcast technology will be significantly more than a system using the original NPSPAC channels as intended, thus the difference in implementation cost must be accounted for.

No matter which alternative is selected, each must also specify the rules regarding secondary use of Mexican channels on US soil.

1) All transmitters using Mexican channels on US soil must be site licensed in the ULS.
2) The secondary use of Mexican 806-809 / 851-854 MHz channels should only allow public safety channels to be used. This will allow public safety to use these channels reliability in places like Tucson which is on the Northern edge of the border zone. Also, as this is the target NPSPAC relocation area in the rest of the US under the Consensus Plan, we can be assured that the radio vendors will support its use for public safety.
3) Do not allow low site SMR cellular secondary use of Mexican 854-856 MHz channels. This would be consistent with the new Consensus Plan band allocation.
4) Allow low site cellular use for the secondary use of Mexican alternate channels in 861-866 MHz. This would be consistent with the new Consensus Plan band allocation.
5) Allow low site cellular use for the secondary use of Mexican channel blocks in 866-869 MHz.
6) Relocation of non-conforming secondary users must also be considered part of the re-banding effort. Some private agreements with Mexican entities may need to be re-worked.

Additionally, all alternatives must clarify the allocation rules of the channels above 821/861 if they are to be allocated to non-Nextel or non-low site SMR users.

1) Every effort should be made to allocate low site/high power SMR users to channels above 821/861 MHz, especially near the 70 mile border zone edge. If NEXTEL and other low site implementations cannot fill the channels above 861 MHz then high site SMR users would be allocated to this spectrum with their agreement and with the protections stated below. Public safety and ILT/Business users should not be allocated above 821/861. If Nextel or low site SMR does not have enough channels that would force non-compatible users above 821/861, then they should purchase channels from existing users and/or in some way compensate public safety for the loss of usable spectrum.
2) Co-channel users of the channels above 821/861 MHz including offset channels must also be cleared and restricted north of the 70 mile border edge to a point where they will not interfere with the border area use or licensees. This would not extend more than 140 miles north of the border.
3) Nextel or other low site SMR users will need to implement band pass filters and power restrictions at their sites to create at least a 1 Mhz buffer above the highest non-Nextel or low site SMR channel allocated above 821/861 MHz in

the border zone, this buffer may extend to sites north of the 70 mile border zone but no more then 140 miles north of the Mexican border.

4) Secondary use of adjacent Mexican channels between 861-866 MHz in the Mexican border area shall be limited to like kind users, so that the secondary use of Mexican channels corresponds with the Primary use of the US channels. This will avoid low site SMR users being on adjacent channels to any high site user and causing interference around the site.
5) Any existing non-conforming use must be changed as part of the re-banding process.

Recommendations:

1) Pursue Alternative 1: Perhaps western Border States statesmen can work directly with the affected Mexican states and provide a timely solution while the treaty is being worked from Washington, D.C.by Congress. Nextel has reached l agreements to allow them to swap the use of Mexican channels which indicates that agreements can be made in a timely fashion.

2) Implement Alternative 3 on an **interim** basis, converting all current users of border area NPSPAC frequencies to normal wide channel users.

3) Clarify and define the rules for secondary use of Mexican channels and clarify the rules for co-channel allocation near the boundary between the border zone and the rest of the United States, when dissimilar users are involved.

4) Implement Alternative 2 – Mandate that equipment vendors support mixed narrow and wide channels. Specify a date certain when this equipment will be available. Update the band plan and rules to accommodate. (This Alternative would not need to be implemented if Alternative 1 is successful)

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